



Decadal variability in the tropical atmosphere: local and remote responses to tropical oceans.

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The tropical ocean basins interact with each other on decadal timescales via atmospheric teleconnections. Knowing the nature of these teleconnections and the mechanisms behind them is important in order to improve our understanding of the workings of the tropical climate and potentially to improve climate forecasting.

Tropical data from various observational datasets has been analysed to investigate relationships between decadal variability in sea surface temperatures (SST) and decadal variability in sea level pressure and precipitation. These analyses aim to identify the extent to which atmospheric changes are forced by a) local and b) remote changes in the tropical oceans. Three key modes of decadal SST variability are considered.

The first mode describes decadal variability of SSTs in the tropical Atlantic and is characterised by a cross equator SST dipole. Regression analysis suggests that there is a local response to SSTs in the south tropical Atlantic and there are associated changes in sea level pressure over parts of Africa and eastern Asia.

The second mode describes decadal variability of SSTs in the tropical Pacific associated with the Interdecadal Pacific Oscillation. Regression analysis suggests that there is a local response to SSTs over the eastern Pacific and a remote response over the Indian Ocean and equatorial Atlantic.

The third mode describes decadal variability of SSTs in the whole of the tropics and shows a tropics wide warming. Regression analysis suggests that there is a local response to warming SSTs in the central Pacific but there is no evidence of local responses in the Indian Ocean or south Atlantic Ocean where SSTs are warming at comparable rates.

Further work has been done imposing SST anomalies, that correspond to the three

modes above, into an atmospheric model and studying the atmospheric response.